

Chapter 8.8

Status of the endangered piping plover, *Charadrius melodus*, population in the Maryland Coastal Bays

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Abstract

The Piping plover, a federally threatened species, restricts its mid-Atlantic breeding activities to early successional shorelines, which harbor an abundance of surface-dwelling prey. To date, the only portion of Assateague Island that has received sufficient tidal influence for cross-island overwash has been a 9.5 km (6 mile) section just south of the Ocean City Inlet, adjacent to the Sinepuxent Bay. Two significant tidal events (1992 and 1998) have helped maintain the early succession habitat in certain areas. For the past eight breeding seasons, the Piping plover breeding population has remained stable at around 60 pairs (and additional non-breeding birds). Although difficult to evaluate, it is possible that the population is at capacity for the available conditions.

Background

The ragged boundary of guts and marsh islands along the eastern edge of the southern Maryland Coastal Bays is a reminder of the historic influence of overwash events. These events provided pulses of energy and change, scouring inlet troughs, distributing sediment and altering water chemistry and circulation patterns.

Over the past century, stabilization efforts necessary for human development along Maryland's ocean beaches have dramatically reduced the influence of tidal events and bay hydrology. This manipulation reduced the tidal prism, bay water exchange rate, and the distribution of coastal sediments. In response, the Coastal Bays have suffered from reduced flushing rates, silting of back bay and creek bottoms, the prevention of saltmarsh expansion, and the impacts that these changes have had on the bay's chemistry, flora, and fauna.

The National Park Service stopped most of the beach stabilization activities on Assateague Island in the mid-1970's. The Park's management strategy is to allow natural tidal events to redefine the constructed primary dune line and ultimately return Assateague to a more natural barrier beach.

The island was not subjected to tidal influences of the magnitude necessary to erode the constructed primary dune system until the 1990's. A set of events, initially in 1991/92 and again in 1998, was successful in redistributing much of the constructed dune. Those overwash events moved beach sand partially across the island adjacent to the Chincoteague Bay, but not enough to influence the bay proper. The wash-over from these events was complete and even resulted in some migration along the island's northernmost 6-mile, often referred to as the 'north end'.

The north end had historically received only minimal alteration from beach stabilization and dredge disposal, but was subjected to a sediment transport deficit due to the influence of the Ocean City inlet jetties. The entrainment of beach sand along the north end resulted in enough beach loss to permit occasional overwash into the Sinepuxent Bay. The low island profile resulting from the periodic overwash had supported Maryland's only breeding population of the Piping plover, a small shorebird that was Federally listed as a Threatened Species in 1985.

The Piping plover restricts its mid-Atlantic breeding activities to early successional shorelines, which harbor an abundance of surface-dwelling prey. Breeding is most successful at inlets free of hardened structures, and within wide expanses of low-lying overwashed barrier spits and islands. Continuous linear dunes, hardened shorelines, and maturing vegetated communities are all avoided by plover for breeding purposes.

Based on Piping Plover population studies from 1986 through 1990 the Maryland breeding birds were concentrated along the north end and scattered pairs in low-lying sections elsewhere along the island. Plovers that successfully raised offspring were those that had access to the low, wet portions of wash-over fans and the bay intertidal beach. Pairs without access to overwashed areas tended to fail in raising young, and widespread failure occurred during years when the fans were closed by vegetation expansion. During the span of the research, the population had dropped from 25 to 14 pairs. Models of survival estimates predicted that local extinction could occur by 2016, short of some major changes to the island habitat.

Following an initial lag period after the 1992 overwash events, the Piping plover responded to the early successional habitat that was created on the north end. Not only did reproductive success rise above the level necessary to increase the local population, adult birds from other breeding sites moved into the Maryland breeding population.

By 1996, the Maryland plover population had risen to 60 pair and has remained relatively constant suggesting that it may be at capacity for the current available habitat. For the past 12 years, reproductive success has averaged 1.4 chicks per pair, which is the calculated rate necessary to maintain the population. This stability has been maintained despite an average nest loss rate of 37%, due primarily to tidal events (the risk of living low), and depredation by crows, gulls and fox.

In 2003, the Army Corps of Engineers, in partnership with the National Park Service and others, began the first of a two-phase process of restoring the sediment flow around the

inlet to the north end of Assateague Island. The initial phase included the installation of a beach and berm filet along the north end to prevent additional erosion prior to the sediment influx that will result from the second long-term project phase. The design of this filet was modeled to permit normal tidal events to impact the habitat at a level similar to the remainder of the island. In concept, the Restoration project has 'made the island whole' in terms of the long-shore sediment budget, and the NPS now returns to its strategy of allowing future tidal events to dictate the surficial features of the island.

At present, the north end of Assateague Island is the only section of the Maryland coastline that is physically functioning in a manner close to natural conditions. The response by early successional species like the Piping plover since the 1992 event provides an indication that the habitat is in transition. The future of species and communities that capitalize on beach migration is expected to change with the periodicity of future tidal events. Maturation of some 'young' habitats will also yield other communities that are also valuable, but not well represented in the Coastal Bays. Newly emergent fresh and saltmarsh wetlands along the North End provide evidence to this evolution.

The southern 12 miles of the Maryland coastline on Assateague still possesses topographic features and vegetated communities that reflect past stabilization efforts. But with time, coastal storms will manipulate this section of the island, resulting in changes to the island in addition to the Chincoteague Bay itself. It is not improbable that inlet formation will be part of that change and the influence to the Coastal Bays could be rather remarkable.

Foraging habitat in the Coastal Bays watershed for the Piping plover occurs bayward of the dune line on Assateague. So, here is to an indicator species, the Piping plover. Our prognosticator of change and all that it offers to the health of the Coastal Bays system.

Status of piping plovers

Efforts to study the Piping plover (*Charadrius melodus*) in Maryland began in 1986, the year that the shorebird was listed as a Threatened species. After 5 years, research results were sobering. With the breeding population dropping from 25 to 14 pair and an annual reproductive success rate 30% below the level necessary to maintain the population, survival estimate models predicted that local (Maryland) extinction could occur by 2016, short of some major changes to coastal habitat.

Plovers on Delmarva are most successful when the breeding pairs have access to moist, unvegetated shoreline habitat supporting abundant invertebrate prey. They appear to prefer areas such as inlets that are free of hardened stabilization structures and overwash fans laid across barrier islands and spits. Unfortunately, coastal Maryland has been managed with a heavy hand for development since the 1950's. The construction of jetties and continuous dunes has eliminated most potential plover breeding habitat along the Coastal Bays.

The National Park Service began to manage the southern 36 kilometers (22 miles) of the Maryland coastline in 1965, and stopped most stabilization activities on Assateague Island in the mid-1970s. Their management strategy has been to allow natural tidal events to redefine the island's previously constructed primary dune line and ultimately return the land to a more natural barrier beach.

To date, the only portion of Assateague Island that has received sufficient tidal influence for cross-island overwash has been a 9.5 km (6 mile) section just south of the Ocean City Inlet, adjacent to the Sinepuxent Bay. An initial pair of tidal events occurred during the winter of 1991/92, but it took a summer or two for the invertebrate population to fully colonize the new early-successional habitat. Leg-band sightings showed that in addition to local breeding birds, plovers were immigrating to Assateague from other breeding sites. After three additional seasons, the Assateague breeding population had tripled to 60 pair, plus 10-15 non-breeding birds.

For the past eight breeding seasons, the Piping plover breeding population has remained stable at around 60 pairs (and additional non-breeding birds). Although difficult to evaluate, it is possible that the population is at capacity for the available conditions. (Table 8.9.1).

Summary

Despite a second tidal event in 1998 that helped maintain the early succession habitat in certain areas, the maturing of the landscape has been constant. The early successional overwash habitat along northern Assateague Island is evolving to other barrier island habitats: dune fields, ephemeral wetlands, shrub thickets and saltmarsh. Those communities have been observed to host a range of wetland and upland faunas that have been absent over the past decade. This normal evolution displaces plovers, due to the loss of open habitat necessary for nesting and foraging. In fact, for the past two seasons the breeding plover population has been under stress as evidenced by aggression between courting, nesting and brood-rearing plovers.

In an ideal world, adjacent barrier beaches would also be managed for sea-level rise and island migration. Tidal events would create new inlets or early-succession beach and plovers would migrate to fill these new niches. The ragged boundary of guts and marsh islands along the eastern edge of the Coastal Bays are reminders of the historic influence of overwash events. We should expect history to eventually repeat itself.

In time, the remaining portion of Assateague will be rearranged by the energy of tides and winds. It is not improbable that inlet formation will be part of that change and the influence to the Coastal Bays could be rather remarkable. Until that change occurs, we may see Maryland's Piping Plover population under peril. Only time and the winds will tell.

References

Loefering, J. 1992. Piping Plover Biology, Foraging Ecology and Behavior on Assateague Island National Seashore, Maryland. Masters Thesis. Virginia Polytechnic Institute and State University, Blacksburg, Virginia. 248 pp.

National Park Service. 1991-2003. Management and Monitoring of the Piping Plover at Assateague Island National Seashore, Maryland – Annual Report. Unpublished report. Assateague Island National Seashore, Berlin, Maryland.

National Park Service. 1997. Piping Plover Management Plan. Unpublished Report. Assateague Island National Seashore, Berlin, Maryland. 24 pp.

Patterson, M. 1988. Piping Plover Breeding Biology and Reproductive Success on Assateague Island. Masters Thesis. Virginia Polytechnic Institute and State University, Blacksburg, Virginia. 129 pp.

U.S. Fish and Wildlife Service. 1996. Piping Plover Atlantic coast population, revised recovery plan. Hadley, Massachusetts. 258 pp.

**Table 8.9.1 Breeding Population and Historic Success of Piping Plover
on Assateague Island National Seashore, MD 1986-2003.**

<i>Year</i>	<i>Maryland Breeding pairs</i>	<i>Nests hatched (% success)</i>	<i>Chicks fledged (% success)</i>	<i>Chicks fledged per pair</i>	<i>Southern Recovery Unit Pairs</i>
1986	17	14 (61%)	18 (47%)	1.1	158
1987	23	16 (48%)	27 (59%)	1.2	160
1988	25	13 (38%)	13 (35%)	0.5	171
1989	20	11 (41%)	18 (50%)	0.9	199
1990	14	8 (40%)	11 (44%)	0.8	201
1991	18	14 (70%)	7 (15%)	0.4	194
1992	24	14 (47%)	24 (56%)	1	172
1993	20	11 (37%)	34 (87%)	1.7	181
1994	32	31 (74%)	77 (74%)	2.4	186
1995	44	41 (91%)	76 (51%)	1.7	217
1996	61	50 (69%)	91 (53%)	1.5	189
1997	60	54 (54%)	60 (34%)	1	204
1998	56	46 (65%)	73 (50%)	1.3	203
1999	58	50 (68%)	63 (43%)	1.1	182
2000	60	46 (48%)	48 (32%)	0.8	183
2001	60	41 (41%)	55 (39%)	0.9	208
2002	60	57 (90%)	111 (54%)	1.9	209
2003	59	48 (67%)	92 (57%)	1.6	